

10. (As amended) The cathode assembly as defined in claim 9 further comprising a filament disposed around the support rod in close proximity to the cathode and isolated from a plasma in the arc chamber.

11. (As amended) The cathode assembly as defined in claim 9 further comprising a filament disposed around the support rod in close proximity to the cathode and isolated from a plasma in the arc chamber, wherein the filament is fabricated of an electrically conductive material and includes an arc-shaped turn having an inside diameter greater than or equal to the diameter of the support rod.

12. (As amended) A cathode assembly for use in an indirectly heated cathode ion source which includes an arc chamber housing that defines an arc chamber, comprising:

a cathode sub-assembly, including a cathode and a support rod fixedly mounted thereto;

a filament for emitting electrons, that is positioned outside the arc chamber in close proximity to the support rod of the cathode sub-assembly;

a cathode insulator for electrically and thermally isolating the cathode from an arc chamber housing, that is disposed around the cathode of the cathode sub-assembly; and

a filament disposed around the support rod in close proximity to the cathode and isolated from a plasma in the arc chamber, wherein the filament is fabricated of an electrically conductive material and includes an arc-shaped turn having an inside diameter greater than or equal to the diameter of the support rod, and wherein a cross-sectional area of the filament varies along a length of the filament, and is smallest along the arc-shaped turn.

13. (As amended) A cathode assembly for use in an indirectly heated cathode ion source which includes an arc chamber housing that defines an arc chamber, comprising:

a cathode sub-assembly, including a cathode and a support rod fixedly mounted thereto;

a filament for emitting electrons, that is positioned outside the arc chamber in close proximity to the support rod of the cathode sub-assembly; and

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a cathode insulator for electrically and thermally isolating the cathode from an arc chamber housing, that is disposed around the cathode of the cathode sub-assembly;

wherein said cathode insulator includes an opening having a diameter that is larger than or equal to the diameter of the cathode.

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15. (As amended) The cathode assembly of claim 13 wherein said cathode insulator has a generally tubular shape with a sidewall and includes a flange, for shielding the sidewall of the cathode insulator from a plasma in the arc chamber.

16. (As amended) The cathode assembly of claim 15 wherein said flange is provided with a groove on a side of the flange facing away from the plasma, for increasing a path length between the cathode and the arc chamber housing.

18. (As amended) A cathode assembly for an ion source comprising:
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a cathode;
a support rod fixedly attached to the cathode;
a cathode insulator for electrically and thermally isolating the cathode from an arc chamber housing; and
an indirect heating device for indirectly heating the cathode.